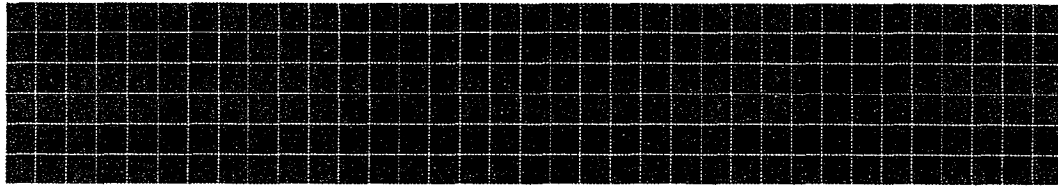


Exhibit L



The Illustrated Computer Dictionary

Third Edition

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retains a copy of the original record as well as provides an amended version. When a file-update program is run, the old master file is termed the father file. The updated file is termed the son file. The file that was used to create the father file is termed the grandfather file. The technique is particularly applicable to files held on magnetic media, such as disk or tape.

fault Condition, such as a broken wire or a short circuit, that causes a component, a computer, or a peripheral device not to perform to its design specifications. Contrast with *error* and *mistake*. See *malfunction*.

fault tolerance Capability of a system to perform its function in accordance with design specifications, even in the presence of hardware or software failures. If, in the event of faults, the system functions can be performed but do not meet the design specifications with respect to the time required to complete the job or the storage capacity required for the job, the system is said to be partially or quasi fault-tolerant. Provided by the application of protective reliability, these resources may consist of more hardware, software, time, or a combination of all three.

FAX (1) *Facsimile*. (2) Equipment configuration that facilitates the transmission of images over a common carrier network.

FCC Acronym for Federal Communications Commission, an organization of the U. S. Government responsible for regulating interstate communications, communications common carriers, and the broadcast media.

FE Acronym for *Field Engineer*.

feasibility study Study concerned with a definition of a data processing problem, together with alternative solutions, a recommended course of action, and a working plan for designing and installing the system. Also called *preliminary study* and *systems study*.

feature Something special accomplished in a program or hardware device, such as the ability

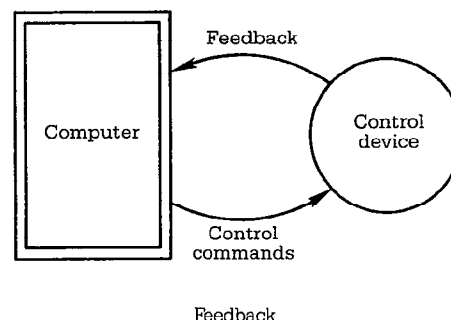
of a word processing program to justify the right margin of text.

feature extraction Selection of dominant characteristics for pattern recognition. Enables a computer-controlled video camera to recognize objects by such features as shapes and edges.

Federal Privacy Act Federal legislation prohibiting secret personnel files from being kept on individuals by government agencies or contractors. Allows individuals to know what information about them is on file and how it is used within all government agencies and their contractors. Also known as Privacy Act of 1974.

feed Mechanical process whereby lengthy materials—such as paper or magnetic tape, line printer paper, and printer ribbon—are moved along the required operating position. See *friction-feed* and *tractor-feed mechanism*.

feedback (1) Means of automatic control in which the actual state of a process is measured and used to obtain a quantity that modifies the input to initiate the activity of the control system. (2) In data processing, information arising from a particular stage of processing could provide a feedback to affect the processing of subsequent data; for example, the fact that an area of storage was nearly full might either delay the acceptance of more data or divert it to some other storage area. (3) Any process whereby output from a sequential task serves to modify subsequent tasks.



relative movement

refreshing Process of constantly reactivating or restoring information that decays or fades away when left idle. Phosphor on a CRT screen needs to be constantly reactivated by an electron beam to remain illuminated. Typically, the image must be regenerated at a rate of 30 to 60 hertz to avoid *flicker*. Likewise, cells in dynamic memory elements must be repeatedly accessed to avoid losing their contents. See *dynamic RAM* and *raster scan*.

refresh memory Area of computer memory that holds values indicating whether a particular dot of a graphics raster is on or off. May also contain information on brightness and color.

refresh rate Rate at which the graphic image on a CRT is redrawn in a refresh display; time needed for one refresh of the displayed image.

regenerate To renew some quantity. Used in storage devices to write back information that has been read in a destructive manner.

region In multiprogramming with a variable number of tasks, a term often used to mean the internal storage space allocated.

register (R) High-speed device used in a central processing unit for temporary storage of small amounts of data or intermittent results during processing. See *general-purpose register*.

registration Accurate positioning relative to a reference.

regression analysis (1) Technique in model-building used to define a dependent variable in terms of a set of independent variables. (2) Construction of a "line of best fit" to best illustrate the pattern of a set of data points.

regression testing Tests performed on a previously verified program whenever it is extended or corrected.

relation (1) Equality, inequality, or any prop-

erty that can be said to hold (or not hold) for two objects in a specified order. (2) In a relational database model, a table, the basic form of information storage. (3) In a network/hierarchical database model, a named association among sets of entities.

relational database management system (RDBMS) Database in which multiple tables can be associated or related to one another based on common data items or fields within the tables. For example, a name and address file might have columns for name, street, city, state, zip, and telephone number. A record could be created for each person by filling in each field. One of the major features of a relational database is the ability to generate a new file with data from two relational files. Compare *hierarchical database management system* and *network database management system*.

relational expression Expression that contains one or more relational operators.

relational model Database model in which items are functionally related.

relational operator Symbol used to compare two values; specifies a condition that may be either true or false, such as = (equal to), < (less than), and > (greater than).

relational structure Form of database organization in which all data items are contained in one file and are linked together by a trail of logical pointers. Relationships among these data items can be altered at will, and the information can be obtained by interactive query or batch processing.

relative address Address to which a *base address* must be added to form the *absolute address* of a particular storage location.

relative coding Coding that uses machine instructions with relative addresses.

relative movement Movement of an object on the screen to a new position in terms of the last position rather than from 0,0. "Move 4, 8" would move a marked point four units to the

banked memory

back panel Back of a computer case, with a number of sockets for connecting peripheral devices to the computer.

backplane Circuitry and mechanical elements used to connect the boards of a system. Main circuit board of a computer into which other circuit boards are plugged. Also called *motherboard* and *system board*.

backspace Keyboard operation that moves the cursor one place to the left. Allows modification of what has already been typed before it is entered into the computer.

backspace tape Process of returning a magnetic tape to the beginning of the preceding record.

backtracking Operation of scanning a list in reverse.

backup (1) Pertaining to procedures or *stand-by equipment* available for use in the event of failure or overloading of the normally used procedures or equipment. (2) To make a copy of a program or data in case the original is lost, damaged, or otherwise inaccessible. See *fail-safe system*, *fail-soft system*, *fall-back*, and *father file*.

backup copy Copy of a file or data set kept for reference in case the original file or data set is destroyed.

backup programmer Programmer who is an assistant to the *chief programmer*.

Backus, John In 1957, at the IBM Corporation, developed the computer language FORTRAN (FORMula TRANslator), a high-level programming language used to perform mathematical, scientific, and engineering computations.

Backus Normal Form (BNF) Notation for describing the *syntax* of programming languages. See *metalanguage*.

backward chaining Goal-driven method of reasoning that proceeds from the desired goal

to the facts already known. Contrast with *forward chaining*.

backward read Feature available on some magnetic tape systems whereby magnetic tape units can transfer data to computer storage while moving in reverse.

badge reader Terminal equipped to read credit cards or specially coded badges.

bad sector Sector on a disk that will not read or write correctly. Usually due to a physical flaw in the disk.

Baldwin, Frank Stephen In 1875, invented the first practical reversible four-process calculator in the United States.

ball printer Printer that has the printing elements on the face of a ball-like replacement element. Type fonts can easily be changed by changing the *typeball*.

band printer Impact printing device that uses a steel band or polyurethane belt to carry the character set. Can produce multiple carbon copies at speeds ranging from 300 to 2 000 lines per minute.

bandwidth In data communications, difference between the highest and lowest frequencies of a band. Used as a measure of the capacity of a communication channel, expressed in bits per second, or bauds. See *broadband*, *narrowband*, and *voice-grade*.

bank (1) In communications, a range of frequencies, as between two specified limits. (2) Range, or scope, of operation. (3) Group of circular recording tracks on a storage device such as a disk or drum.

banked memory Method of enlarging the usual 64K RAM memory. Space addressable by 8-bit microprocessors to a much larger range, usually to 1 megabyte. To avoid addressing confusion, boards above 64K are switched on by software control only when needed.

notebook computer

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character can
contrast with
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information cannot be erased during the course of computation, such as punched paper tape, punched cards, and certain nondestructible readout magnetic memories.

nonexecutable statement Program statement that sets up a program but does not call for any specific action on the part of the program in which it appears. Contrast with *executable statement*.

nongraphic character Character that, when set for a printer or display unit, does not produce a printable character image, such as carriage control and upper case.

nonimpact printer Printer that uses electricity, heat, laser technology, or photographic techniques to print output. See *electrostatic printer*, *laser printer*, and *thermal printer*. Contrast with *impact printer*.

nonlinear programming Area of applied mathematics concerned with finding the values of the variables that give the smallest or largest value of a specified function in the class of all variables satisfying prescribed conditions. Contrast with *linear programming*.

nonnumeric programming Programming that deals with symbols rather than numbers. Usually refers to the manipulation of symbolic objects, such as words, rather than the performance of numerical calculations.

nonoverlap processing Technique whereby reading, writing, and internal processing occur only in a serial manner. Contrast with *overlap processing*.

nonprint Pertaining to an impulse that inhibits line printing under machine control.

nonprocedural query language Computer language for interacting with a database. It specifies what the user wants to know rather than the steps needed to produce the information, which are worked out by the computer. For example, on some systems the user fills out a screen showing a blank record with ranges of

values desired for selected fields. See *query language*.

nonreflective ink Any color of ink recognizable to an optical character reader. Also called *read ink*.

nonsequential computer Computer that must be directed to the location of each instruction.

nonswitched line Communications link permanently installed between two points. Also called *leased line*.

nonvolatile storage Storage medium that retains its data in the absence of power, such as *magnetic bubble memory* and *magnetic core storage*. Contrast with *volatile storage*.

no-op (NOP) Abbreviation of no-operation, as in *no-operation instruction*.

no-operation instruction Computer instruction whose only effect is to advance the instruction counter. Accomplishes nothing more than to advance itself to the next instruction in normal sequence.

NOP Acronym for No-Operation. See *no-operation instruction*.

NOR Boolean operator that gives a truth table value of true only when both of the variables connected by the logical operator are false. Compare *AND*, *OR*, and *XOR*.

normalize To adjust the exponent and fraction of a floating-point quantity so the fraction is within a prescribed range. Loosely, to *scale*.

NOT Logic operator having the property that, if P is a statement, then the NOT of P is true if P is false and false if P is true.

notation See *Polish notation* and *positional notation*.

notebook computer Briefcase-sized computer that uses a flat panel liquid crystal display. Larger than a *hand-held computer* but smaller than a *portable computer*.

store-and-forward

Stibitz, George In the design of his *analytical engine*, Charles Babbage listed four elements a machine had to include to perform the functions of a human computer: an arithmetic unit; a memory; automatic "choice" of computing sequence; and input and output. In 1946, George Stibitz, then a research mathematician with Bell Telephone Laboratories, designed several relay calculators that incorporated the ideas of Babbage. See *Babbage, Charles*.

stochastic procedures Trial and error, as opposed to algorithmic procedures.

stochastic process Any process dealing with events that develop in time or space and that cannot be described precisely, except in terms of *probability theory*

stop bit (1) Bit or group of bits that identifies the end of a data word and defines the space between data words. See *group mark*. (2) Bit indicating the end of an asynchronous serial transmission. Contrast with *start bit*.

stop code Specific control character.

storage Descriptive of a device or medium that can accept data, hold it, and deliver it on demand at a later time. The term is preferred over *memory*. See *auxiliary storage*, *internal storage*, *PROM*, *protected storage*, *RAM*, and *ROM*.

storage allocation Assignment of specific programs, program segments, and/or blocks of data to specific portions of a computer's storage. Sometimes called memory allocation. See *program storage*.

storage block Contiguous area of internal storage.

storage capacity Number of items of data that a storage device is capable of containing. Frequently defined in terms of computer bytes (K bytes or M bytes) or words (K words).

storage circuit Circuit that can be switched into either of two stable states, 0 or 1.

storage device Device used for storing data within a computer system, such as integrated circuit storage, magnetic disk unit, magnetic tape unit, magnetic drum unit, floppy disk, and tape cassette.

storage dump Printout of all or part of the contents of the internal storage of a computer. Often used to diagnose errors. Also called *memory dump*. See *post mortem dump* and *snapshot dump*.

storage key Indicator associated with a storage block or blocks; it requires that tasks have a matching protection key to use the blocks. See *privileged instruction* and *storage protection*.

storage location Position in storage where a character, byte, or word may be stored. Same as *cell*.

storage map Diagram that shows where programs and data are stored in the storage units of the computer systems. Also called *map*. (See page 278.)

storage pool Group of similar storage devices; disk drives in a computer installation are collectively referred to as the disk pool.

storage protection Protection against unauthorized writing in and/or reading from all or part of a storage device. Generally implemented automatically by hardware facilities, usually in connection with an operating system. Sometimes called memory protection. See *storage key*.

storage tube Electron tube into which information can be introduced and then extracted at a later time. Used in *first generation computers*.

storage unit See *storage device*.

store (1) British term for storage. (2) To place in storage.

store-and-forward In data communications, the process-handling messages used in a message-switching system.